

# SEQUENCE LISTING

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<120> SUBSTRATES OF N-END RULE UBIQUITYLATION AND METHODS FOR MEASURING  
THE UBIQUITYLATION OF THESE SUBSTRATES

<130> 2528-10 / P14050US0

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<141> 2003-10-28

<150> US 60/422,448  
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<160> 24

<170> PatentIn version 3.2

<210> 1  
<211> 447  
<212> PRT  
<213> Homo sapiens

<400> 1

Met Ala Glu Pro Arg Gln Glu Phe Glu Val Met Glu Asp His Ala Gly  
1 5 10 15

Thr Tyr Gly Leu Gly Asp Arg Lys Asp Gln Gly Gly Tyr Thr Met His  
20 25 30

Gln Asp Gln Glu Gly Asp Thr Asp Ala Gly Leu Lys Glu Ser Pro Leu  
35 40 45

Gln Thr Pro Thr Glu Asp Gly Ser Glu Glu Pro Gly Ser Glu Thr Ser  
50 55 60

Asp Ala Lys Ser Thr Pro Thr Ala Glu Ala Glu Glu Ala Gly Ile Gly  
65 70 75 80

Asp Thr Pro Ser Leu Glu Asp Glu Ala Ala Gly His Val Thr Gln Ala  
85 90 95

Arg Met Val Ser Lys Ser Lys Asp Gly Thr Gly Ser Asp Asp Lys Lys  
 100 105 110

Ala Lys Thr Ser Thr Arg Ser Ser Ala Lys Thr Leu Lys Asn Arg Pro  
 115 120 125

Cys Leu Ser Pro Lys His Pro Thr Pro Gly Ser Ser Asp Pro Leu Ile  
 130 135 140

Gln Pro Ser Ser Pro Ala Val Cys Pro Glu Pro Pro Ser Ser Pro Lys  
 145 150 155 160

Tyr Val Ser Ser Val Thr Pro Arg Thr Gly Ser Ser Gly Ala Lys Glu  
 165 170 175

Met Lys Leu Lys Gly Ala Asp Gly Lys Thr Lys Ile Ala Thr Pro Arg  
 180 185 190

Gly Ala Ala Pro Pro Gly Gln Lys Gly Gln Ala Asn Ala Thr Arg Ile  
 195 200 205

Pro Ala Lys Thr Pro Pro Ala Pro Lys Thr Pro Pro Ser Ser Gly Glu  
 210 215 220

Pro Pro Lys Ser Gly Asp Arg Ser Gly Tyr Ser Ser Pro Gly Ser Pro  
 225 230 235 240

Gly Thr Pro Gly Ser Arg Ser Arg Thr Pro Ser Leu Pro Thr Pro Pro  
 245 250 255

Thr Arg Glu Pro Lys Lys Val Ala Val Val Arg Thr Pro Pro Lys Ser  
 260 265 270

Pro Ser Ser Ala Lys Ser Arg Leu Gln Thr Ala Pro Val Pro Met Pro  
 275 280 285

Asp Leu Lys Asn Val Lys Ser Lys Ile Gly Ser Thr Glu Asn Leu Lys  
 290 295 300

His Gln Pro Gly Gly Gly Lys Val Gln Ile Val Tyr Lys Pro Val Asp  
 305 310 315 320

Leu Ser Lys Val Thr Ser Lys Cys Gly Ser Leu Gly Asn Ile His His  
 325 330 335

Lys Pro Gly Gly Gly Gln Val Glu Val Lys Ser Glu Lys Leu Asp Phe  
 340 345 350

Lys Asp Arg Val Gln Ser Lys Ile Gly Ser Leu Asp Asn Ile Thr His  
 355 360 365

Val Pro Gly Gly Gly Asn Lys Lys Ile Glu Thr His Lys Leu Thr Phe  
 370 375 380

Arg Glu Asn Ala Lys Ala Lys Thr Asp His Gly Ala Glu Ile Val Tyr  
 385 390 395 400

Lys Ser Pro Val Val Ser Gly Asp Thr Ser Pro Arg His Leu Ser Asn  
 405 410 415

Val Ser Ser Thr Gly Ser Ile Asp Met Val Asp Ser Pro Gln Leu Ala  
 420 425 430

Thr Leu Ala Asp Glu Val Ser Ala Ser Leu Ala Lys Gln Gly Leu  
 435 440 445

<210> 2  
 <211> 335  
 <212> PRT  
 <213> Homo sapiens

<400> 2

Met Arg Val Cys Trp Leu Val Arg Gln Asp Ser Arg His Gln Arg Ile  
 1 5 10 15

Lys Leu Pro His Leu Glu Ala Val Val Ile Gly Arg Ser Pro Glu Thr  
 20 25 30

Lys Ile Thr Asp Lys Lys Cys Ser Arg Gln Gln Val Gln Leu Lys Ala  
 35 40 45

Glu Cys Asn Lys Gly Tyr Val Lys Val Gln Gln Met Gly Val Asn Pro  
 50 55 60

Thr Ser Ile Asp Ser Gly Val Ile Gly Lys Asp Gln Glu Lys Leu Leu  
 65 70 75 80

Leu Pro Gly Gln Val Leu His Met Val Asn Gly Leu Tyr Pro Tyr Ile  
 85 90 95

Val Glu Phe Glu Glu Val Ala Glu Ser Pro Asn Leu Thr Gln Arg Lys  
 100 105 110

Arg Lys Arg Ser Asp Cys Asp Ser Glu Glu Met Glu Ala Glu Ser Gly  
 115 120 125

Thr Gly Leu Ala Pro Gly Ser Ser Pro Ser Gln Cys Ser Val Ser Pro  
 130 135 140

Lys Lys Asp Lys Asn Gly Ala Thr Lys Lys Glu Ser Leu Gly His Trp  
 145 150 155 160

Ser Gln Gly Leu Lys Met Ser Met Lys Asp Pro Lys Met Gln Val Tyr  
 165 170 175

Lys Asp Asp Gln Val Val Val Ile Lys Asp Lys Tyr Pro Lys Ala Arg  
 180 185 190

His His Trp Leu Val Leu Pro Trp Ala Ser Ile Ser Ser Leu Lys Val  
 195 200 205

Val Thr Ser Glu His Leu Glu Leu Leu Lys His Met His Ala Val Gly  
 210 215 220

Glu Lys Val Ile Ala Glu Phe Ala Gly Ser Ser Lys Leu Arg Phe Arg  
 225 230 235 240

Leu Gly Tyr His Ala Ile Pro Ser Met Ser His Val His Leu His Val  
 245 250 255

Ile Ser Gln Asp Phe Asp Ser Pro Cys Leu Lys Asn Lys Lys His Trp  
 260 265 270

Asn Ser Phe Asn Thr Glu Tyr Phe Leu Glu Ser Gln Ala Val Ile Lys  
 275 280 285

Met Val Gln Glu Ala Gly Arg Val Thr Val Lys Asp Gly Thr Cys Glu  
 290 295 300

Leu Leu Lys Leu Pro Leu Arg Cys His Glu Cys Gln Gln Leu Leu Pro  
 305 310 315 320

Ser Ile Pro Gln Leu Lys Glu His Leu Arg Lys His Trp Gly Gly  
 325 330 335

<210> 3  
 <211> 376  
 <212> PRT  
 <213> Homo sapiens

<400> 3

Met Ser Lys Ser Val Pro Ala Phe Leu Gln Asp Glu Ser Asp Asp Arg  
 1 5 10 15

Glu Thr Asp Thr Ala Ser Glu Ser Ser Tyr Gln Leu Ser Arg His Lys  
 20 25 30

Lys Ser Pro Ser Ser Leu Thr Asn Leu Ser Ser Ser Ser Gly Met Thr  
 35 40 45

Ser Leu Ser Ser Val Ser Gly Ser Val Met Ser Val Tyr Ser Gly Asp  
 50 55 60

Phe Gly Asn Leu Glu Val Lys Gly Asn Ile Gln Phe Ala Ile Glu Tyr  
 65 70 75 80

Val Glu Ser Leu Lys Glu Leu His Val Phe Val Ala Gln Cys Lys Asp  
 85 90 95

Leu Ala Ala Ala Asp Val Lys Lys Gln Arg Ser Asp Pro Tyr Val Lys  
 100 105 110

Ala Tyr Leu Leu Pro Asp Lys Gly Lys Met Gly Lys Lys Lys Thr Leu  
 115 120 125

Val Val Lys Lys Thr Leu Asn Pro Val Tyr Asn Glu Ile Leu Arg Tyr  
 130 135 140

Lys Ile Glu Lys Gln Ile Leu Lys Thr Gln Lys Leu Asn Leu Ser Ile  
 145 150 155 160

Trp His Arg Asp Thr Phe Lys Arg Asn Ser Phe Leu Gly Glu Val Glu  
165 170 175

Leu Asp Leu Glu Thr Trp Asp Trp Asp Asn Lys Gln Asn Lys Gln Leu  
180 185 190

Arg Trp Tyr Pro Leu Lys Arg Lys Thr Ala Pro Val Ala Leu Glu Ala  
195 200 205

Glu Asn Arg Gly Glu Met Lys Leu Ala Leu Gln Tyr Val Pro Glu Pro  
210 215 220

Val Pro Gly Lys Lys Leu Pro Thr Thr Gly Glu Val His Ile Trp Val  
225 230 235 240

Lys Glu Cys Leu Asp Leu Pro Leu Leu Arg Gly Ser His Leu Asn Ser  
245 250 255

Phe Val Lys Cys Thr Ile Leu Pro Asp Thr Ser Arg Lys Ser Arg Gln  
260 265 270

Lys Thr Arg Ala Val Gly Lys Thr Thr Asn Pro Ile Phe Asn His Thr  
275 280 285

Met Val Tyr Asp Gly Phe Arg Pro Glu Asp Leu Met Glu Ala Cys Val  
290 295 300

Glu Leu Thr Val Trp Asp His Tyr Lys Leu Thr Asn Gln Phe Leu Gly  
305 310 315 320

Gly Leu Arg Ile Gly Phe Gly Thr Gly Lys Ser Tyr Gly Thr Glu Val  
325 330 335

Asp Trp Met Asp Ser Thr Ser Glu Glu Val Ala Leu Trp Glu Lys Met  
340 345 350

Val Asn Ser Pro Asn Thr Trp Ile Glu Ala Thr Leu Pro Leu Arg Met  
355 360 365

Leu Leu Ile Ala Lys Ile Ser Lys  
370 375

<210> 4

<211> 90  
 <212> PRT  
 <213> Homo sapiens

<400> 4

Met Pro Lys Arg Lys Ala Glu Gly Asp Ala Lys Gly Asp Lys Ala Lys  
 1 5 10 15

Val Lys Asp Glu Pro Gln Arg Arg Ser Ala Arg Leu Ser Ala Lys Pro  
 20 25 30

Ala Pro Pro Lys Pro Glu Pro Lys Pro Lys Lys Ala Pro Ala Lys Lys  
 35 40 45

Gly Glu Lys Val Pro Lys Gly Lys Lys Gly Lys Ala Asp Ala Gly Lys  
 50 55 60

Glu Gly Asn Asn Pro Ala Glu Asn Gly Asp Ala Lys Thr Asp Gln Ala  
 65 70 75 80

Gln Lys Ala Glu Gly Ala Gly Asp Ala Lys  
 85 90

<210> 5  
 <211> 90  
 <212> PRT  
 <213> Homo sapiens

<400> 5

Met Pro Lys Arg Lys Ala Glu Gly Asp Ala Lys Gly Asp Lys Ala Lys  
 1 5 10 15

Val Lys Asp Glu Pro Gln Arg Arg Ser Ala Arg Leu Ser Ala Lys Pro  
 20 25 30

Ala Pro Pro Lys Pro Glu Pro Lys Pro Lys Lys Ala Pro Ala Lys Lys  
 35 40 45

Gly Glu Lys Val Pro Lys Gly Lys Lys Gly Lys Ala Asp Ala Gly Lys  
 50 55 60

Glu Gly Asn Asn Pro Ala Glu Asn Gly Asp Ala Lys Thr Asp Gln Ala  
 65 70 75 80

Gln Lys Ala Glu Gly Ala Gly Asp Ala Lys  
85 90

<210> 6  
<211> 560  
<212> PRT  
<213> Homo sapiens

<400> 6

Met Pro Gln Thr Arg Ser Gln Ala Gln Ala Thr Ile Ser Phe Pro Lys  
1 5 10 15

Arg Lys Leu Ser Arg Ala Leu Asn Lys Ala Lys Asn Ser Ser Asp Ala  
20 25 30

Lys Leu Glu Pro Thr Asn Val Gln Thr Val Thr Cys Ser Pro Arg Val  
35 40 45

Lys Ala Leu Pro Leu Ser Pro Arg Lys Arg Leu Gly Asp Asp Asn Leu  
50 55 60

Cys Asn Thr Pro His Leu Pro Pro Cys Ser Pro Pro Lys Gln Gly Lys  
65 70 75 80

Lys Glu Asn Gly Pro Pro His Ser His Thr Leu Lys Gly Arg Arg Leu  
85 90 95

Val Phe Asp Asn Gln Leu Thr Ile Lys Ser Pro Ser Lys Arg Glu Leu  
100 105 110

Ala Lys Val His Gln Asn Lys Ile Leu Ser Ser Val Arg Lys Ser Gln  
115 120 125

Glu Ile Thr Thr Asn Ser Glu Gln Arg Cys Pro Leu Lys Lys Glu Ser  
130 135 140

Ala Cys Val Arg Leu Phe Lys Gln Glu Gly Thr Cys Tyr Gln Gln Ala  
145 150 155 160

Lys Leu Val Leu Asn Thr Ala Val Pro Asp Arg Leu Pro Ala Arg Glu  
165 170 175

Arg Glu Met Asp Val Ile Arg Asn Phe Leu Arg Glu His Ile Cys Gly  
180 185 190



Lys Lys Ala Gly Ser Leu Tyr Leu Ser Gly Ala Pro Gly Thr Gly Lys  
 195 200 205

Thr Ala Cys Leu Ser Arg Ile Leu Gln Asp Leu Lys Lys Glu Leu Lys  
 210 215 220

Gly Phe Lys Thr Ile Met Leu Asn Cys Met Ser Leu Arg Thr Ala Gln  
 225 230 235 240

Ala Val Phe Pro Ala Ile Ala Gln Glu Ile Cys Gln Glu Glu Val Ser  
 245 250 255

Arg Pro Ala Gly Lys Asp Met Met Arg Lys Leu Glu Lys His Met Thr  
 260 265 270

Ala Glu Lys Gly Pro Met Ile Val Leu Val Leu Asp Glu Met Asp Gln  
 275 280 285

Leu Asp Ser Lys Gly Gln Asp Val Leu Tyr Thr Leu Phe Glu Trp Pro  
 290 295 300

Trp Leu Ser Asn Ser His Leu Val Leu Ile Gly Ile Ala Asn Thr Leu  
 305 310 315 320

Asp Leu Thr Asp Arg Ile Leu Pro Arg Leu Gln Ala Arg Glu Lys Cys  
 325 330 335

Lys Pro Gln Leu Leu Asn Phe Pro Pro Tyr Thr Arg Asn Gln Ile Val  
 340 345 350

Thr Ile Leu Gln Asp Arg Leu Asn Gln Val Ser Arg Asp Gln Val Leu  
 355 360 365

Asp Asn Ala Ala Val Gln Phe Cys Ala Arg Lys Val Ser Ala Val Ser  
 370 375 380

Gly Asp Val Arg Lys Ala Leu Asp Val Cys Arg Arg Ala Ile Glu Ile  
 385 390 395 400

Val Glu Ser Asp Val Lys Ser Gln Thr Ile Leu Lys Pro Leu Ser Glu  
 405 410 415

Cys Lys Ser Pro Ser Glu Pro Leu Ile Pro Lys Arg Val Gly Leu Ile  
 420 425 430

His Ile Ser Gln Val Ile Ser Glu Val Asp Gly Asn Arg Met Thr Leu  
 435 440 445

Ser Gln Glu Gly Ala Gln Asp Ser Phe Pro Leu Gln Gln Lys Ile Leu  
 450 455 460

Val Cys Ser Leu Met Leu Leu Ile Arg Gln Leu Lys Ile Lys Glu Val  
 465 470 475 480

Thr Leu Gly Lys Leu Tyr Glu Ala Tyr Ser Lys Val Cys Arg Lys Gln  
 485 490 495

Gln Val Ala Ala Val Asp Gln Ser Glu Cys Leu Ser Leu Ser Gly Leu  
 500 505 510

Leu Glu Ala Arg Gly Ile Leu Gly Leu Lys Arg Asn Lys Glu Thr Arg  
 515 520 525

Leu Thr Lys Val Phe Phe Lys Ile Glu Glu Lys Glu Ile Glu His Ala  
 530 535 540

Leu Lys Asp Lys Ala Leu Ile Gly Asn Ile Leu Ala Thr Gly Leu Pro  
 545 550 555 560

<210> 7  
 <211> 560  
 <212> PRT  
 <213> Homo sapiens

<400> 7

Met Pro Gln Thr Arg Ser Gln Ala Gln Ala Thr Ile Ser Phe Pro Lys  
 1 5 10 15

Arg Lys Leu Ser Arg Ala Leu Asn Lys Ala Lys Asn Ser Ser Asp Ala  
 20 25 30

Lys Leu Glu Pro Thr Asn Val Gln Thr Val Thr Cys Ser Pro Arg Val  
 35 40 45

Lys Ala Leu Pro Leu Ser Pro Arg Lys Arg Leu Gly Asp Asp Asn Leu  
 50 55 60

Cys Asn Thr Pro His Leu Pro Pro Cys Ser Pro Pro Lys Gln Gly Lys  
 65 70 75 80

Lys Glu Asn Gly Pro Pro His Ser His Thr Leu Lys Gly Arg Arg Leu  
 85 90 95

Val Phe Asp Asn Gln Leu Thr Ile Lys Ser Pro Ser Lys Arg Glu Leu  
 100 105 110

Ala Lys Val His Gln Asn Lys Ile Leu Ser Ser Val Arg Lys Ser Gln  
 115 120 125

Glu Ile Thr Thr Asn Ser Glu Gln Arg Cys Pro Leu Lys Lys Glu Ser  
 130 135 140

Ala Cys Val Arg Leu Phe Lys Gln Glu Gly Thr Cys Tyr Gln Gln Ala  
 145 150 155 160

Lys Leu Val Leu Asn Thr Ala Val Pro Asp Arg Leu Pro Ala Arg Glu  
 165 170 175

Arg Glu Met Asp Val Ile Arg Asn Phe Leu Arg Glu His Ile Cys Gly  
 180 185 190

Lys Lys Ala Gly Ser Leu Tyr Leu Ser Gly Ala Pro Gly Thr Gly Lys  
 195 200 205

Thr Ala Cys Leu Ser Arg Ile Leu Gln Asp Leu Lys Lys Glu Leu Lys  
 210 215 220

Gly Phe Lys Thr Ile Met Leu Asn Cys Met Ser Leu Arg Thr Ala Gln  
 225 230 235 240

Ala Val Phe Pro Ala Ile Ala Gln Glu Ile Cys Gln Glu Glu Val Ser  
 245 250 255

Arg Pro Ala Gly Lys Asp Met Met Arg Lys Leu Glu Lys His Met Thr  
 260 265 270

Ala Glu Lys Gly Pro Met Ile Val Leu Val Leu Asp Glu Met Asp Gln  
 275 280 285

Leu Asp Ser Lys Gly Gln Asp Val Leu Tyr Thr Leu Phe Glu Trp Pro  
 290 295 300

Trp Leu Ser Asn Ser His Leu Val Leu Ile Gly Ile Ala Asn Thr Leu  
 305 310 315 320

Asp Leu Thr Asp Arg Ile Leu Pro Arg Leu Gln Ala Arg Glu Lys Cys  
 325 330 335

Lys Pro Gln Leu Leu Asn Phe Pro Pro Tyr Thr Arg Asn Gln Ile Val  
 340 345 350

Thr Ile Leu Gln Asp Arg Leu Asn Gln Val Ser Arg Asp Gln Val Leu  
 355 360 365

Asp Asn Ala Ala Val Gln Phe Cys Ala Arg Lys Val Ser Ala Val Ser  
 370 375 380

Gly Asp Val Arg Lys Ala Leu Asp Val Cys Arg Arg Ala Ile Glu Ile  
 385 390 395 400

Val Glu Ser Asp Val Lys Ser Gln Thr Ile Leu Lys Pro Leu Ser Glu  
 405 410 415

Cys Lys Ser Pro Ser Glu Pro Leu Ile Pro Lys Arg Val Gly Leu Ile  
 420 425 430

His Ile Ser Gln Val Ile Ser Glu Val Asp Gly Asn Arg Met Thr Leu  
 435 440 445

Ser Gln Glu Gly Ala Gln Asp Ser Phe Pro Leu Gln Gln Lys Ile Leu  
 450 455 460

Val Cys Ser Leu Met Leu Leu Ile Arg Gln Leu Lys Ile Lys Glu Val  
 465 470 475 480

Thr Leu Gly Lys Leu Tyr Glu Ala Tyr Ser Lys Val Cys Arg Lys Gln  
 485 490 495

Gln Val Ala Ala Val Asp Gln Ser Glu Cys Leu Ser Leu Ser Gly Leu  
500 505 510

Leu Glu Ala Arg Gly Ile Leu Gly Leu Lys Arg Asn Lys Glu Thr Arg  
515 520 525

Leu Thr Lys Val Phe Phe Lys Ile Glu Glu Lys Glu Ile Glu His Ala  
530 535 540

Leu Lys Asp Lys Ala Leu Ile Gly Asn Ile Leu Ala Thr Gly Leu Pro  
545 550 555 560

<210> 8  
<211> 77  
<212> PRT  
<213> Homo sapiens

<400> 8

Met Pro Lys Arg Lys Ser Pro Glu Asn Thr Glu Gly Lys Asp Gly Ser  
1 5 10 15

Lys Val Thr Lys Gln Glu Pro Thr Arg Arg Ser Ala Arg Leu Ser Ala  
20 25 30

Lys Pro Ala Pro Pro Lys Pro Glu Pro Lys Pro Arg Lys Thr Ser Ala  
35 40 45

Lys Lys Glu Pro Gly Ala Lys Ile Ser Arg Gly Ala Lys Gly Lys Lys  
50 55 60

Glu Glu Lys Gln Glu Ala Gly Lys Glu Gly Thr Glu Asn  
65 70 75

<210> 9  
<211> 95  
<212> PRT  
<213> Homo sapiens

<400> 9

Met Pro Lys Arg Lys Ser Pro Glu Asn Thr Glu Gly Lys Asp Gly Ser  
1 5 10 15

Lys Val Thr Lys Gln Glu Pro Thr Arg Arg Ser Ala Arg Leu Ser Ala  
20 25 30

Lys Pro Ala Pro Pro Lys Pro Glu Pro Lys Pro Arg Lys Thr Ser Ala  
 35 40 45

Lys Lys Glu Pro Gly Ala Lys Ile Ser Arg Gly Ala Lys Gly Lys Lys  
 50 55 60

Glu Glu Lys Gln Glu Ala Gly Lys Glu Gly Thr Ala Pro Ser Glu Asn  
 65 70 75 80

Gly Glu Thr Lys Ala Glu Glu Val Leu Ser Ile Asn Thr Ser His  
 85 90 95

<210> 10  
 <211> 560  
 <212> PRT  
 <213> Homo sapiens

<400> 10

Met Gly Lys Gly Phe Gln Asn Phe Met Ser Lys Lys Asp Phe His Pro  
 1 5 10 15

Ser Ala Phe Arg Asn Leu Lys Met Val Trp Glu Ala Arg Gln Lys Lys  
 20 25 30

Ser Leu Glu Asp Lys Arg Gln Glu Glu Leu Arg Val Ala Tyr Glu Lys  
 35 40 45

Glu Gln Glu Ile Leu Asn Asn Lys Ala Leu Leu Gly Asp Glu Lys Ala  
 50 55 60

Lys Met Gly Leu Ser Phe Met Tyr Asp Ala Pro Ala Gly Met Thr Lys  
 65 70 75 80

Arg Glu Glu Pro Lys Glu Glu Pro Lys Phe Glu Trp Gln Arg Lys Tyr  
 85 90 95

Gln Ala Pro Arg Glu Asp Trp Ala Lys Gly Asn Glu Glu Ile Gln Asp  
 100 105 110

Gln Pro Phe Gly Ile Gln Val Arg Asn Val Arg Cys Cys Lys Cys His  
 115 120 125

Lys Trp Gly His Ile Asn Thr Asp Arg Glu Cys Pro Leu Phe Gly Lys  
 130 135 140

Ser Gly Asn Phe Glu Asp Glu Gly Tyr Ala Asn Asn Pro Ser Asp Leu  
 145 150 155 160

Ile Lys Asp Leu Arg Arg Arg Arg Gln Glu Gly Lys Ala Gly Pro Ser  
 165 170 175

Thr Ser Lys Ser Ser Ala Ala Ala Ala Thr Gly Glu Asp Asp Asp Glu  
 180 185 190

Asp Glu Trp Met Asp His Gln Gln Leu Ala Ser Asp Met Arg Glu Glu  
 195 200 205

His Gly Ile Lys Leu Lys Ser Ser Val Leu Ala Gly Met Gln Thr Asp  
 210 215 220

Gln Gln Leu Thr Arg Met Lys Lys Glu Met Thr Glu Glu Glu Met Met  
 225 230 235 240

Leu Glu Phe Phe Asn Ser Met Thr Glu Lys Glu Lys Lys Lys Leu His  
 245 250 255

Lys Lys Leu Met Ser Gly Ala Asp Leu Glu Asp Val Met Lys Lys Lys  
 260 265 270

Ser Lys Lys Glu Lys Lys Lys Glu Lys Lys Glu Lys Arg Lys Asn Lys  
 275 280 285

Asp Lys Lys Lys Asp Lys Lys Lys Asn Lys Lys Ser Lys Ser Arg Glu  
 290 295 300

Thr Asp Asp Asp Ser Asp Gly Ser Asp Ser Glu Asp Asp Trp Lys Glu  
 305 310 315 320

Lys Ser Ser Lys Arg Ile Lys Arg Glu Val Glu Ser Ser Pro Glu Tyr  
 325 330 335

Arg Ser Lys Tyr Ile Lys Gln Glu Val Leu Ser Glu Asp Glu Asn Ser  
 340 345 350

His Gly Arg Lys Asp Ser Ser Arg Lys Arg Ala His Asn Asp Ser Glu  
 355 360 365

Ser Ser Asn Glu Val Arg Ser Ser Glu Arg Lys Arg Ser Arg Arg Asp  
 370 375 380

Asp Ser Pro Asn Ala Lys Arg Ser Ile Gly Leu Lys Ser Pro Glu Arg  
 385 390 395 400

Arg Ser Ser Arg Asp Arg Lys Ser Ser Pro Lys Gln Arg Gln Asp Ser  
 405 410 415

Pro Val Arg Arg Arg Arg Ser Pro Ser Ser Ile Arg Lys Glu Ser Gln  
 420 425 430

Arg Val Arg Lys His Ser Pro Glu Gln Lys Arg Asn Gly Arg His Asp  
 435 440 445

Ser Arg Ser Val Ser Pro Val Arg Arg Arg Arg Ser Pro Ser Pro Asp  
 450 455 460

Asn Arg Gln Leu Gly Ser Arg Lys Gln Tyr Ser Pro Leu Arg Arg Arg  
 465 470 475 480

Gln Ser Ser Pro Met Val Ala Ser Pro Arg Arg Arg Arg Ser Pro Ser  
 485 490 495

Pro Glu Arg Gln Arg Lys Arg Arg Ser Pro Ser Asp Ser Pro Pro Thr  
 500 505 510

Arg Arg Leu Ser Thr Ser Pro Ile Arg Arg Arg Arg Ser Pro Ser Pro  
 515 520 525

Asn Lys Leu Pro Val Arg Arg Arg Arg His Asp Ser Gly Ser Pro Asp  
 530 535 540

Arg Asp Gly Ser Glu Ser Pro Lys Met Trp Arg Lys Lys Ser His Lys  
 545 550 555 560

<210> 11  
 <211> 225  
 <212> PRT  
 <213> Homo sapiens



<400> 11

Met Ser Arg Pro Arg Lys Arg Leu Ala Gly Thr Ser Gly Ser Asp Lys  
1 5 10 15

Gly Leu Ser Gly Lys Arg Thr Lys Thr Glu Asn Ser Gly Glu Ala Leu  
20 25 30

Ala Lys Val Glu Asp Ser Asn Pro Gln Lys Thr Ser Ala Thr Lys Asn  
35 40 45

Cys Leu Lys Asn Leu Ser Ser His Trp Leu Met Lys Ser Glu Pro Glu  
50 55 60

Ser Arg Leu Glu Lys Gly Val Asp Val Lys Phe Ser Ile Glu Asp Leu  
65 70 75 80

Lys Ala Gln Pro Lys Gln Thr Thr Cys Trp Asp Gly Val Arg Asn Tyr  
85 90 95

Gln Ala Arg Asn Phe Leu Arg Ala Met Lys Leu Gly Glu Glu Ala Phe  
100 105 110

Phe Tyr His Ser Asn Cys Lys Glu Pro Gly Ile Ala Gly Leu Met Lys  
115 120 125

Ile Val Lys Glu Ala Tyr Pro Asp His Thr Gln Phe Glu Lys Asn Asn  
130 135 140

Pro His Tyr Asp Pro Ser Ser Lys Glu Asp Asn Pro Lys Trp Ser Met  
145 150 155 160

Val Asp Val Gln Phe Val Arg Met Met Lys Arg Phe Ile Pro Leu Ala  
165 170 175

Glu Leu Lys Ser Tyr His Gln Ala His Lys Ala Thr Gly Gly Pro Leu  
180 185 190

Lys Asn Met Val Leu Phe Thr Arg Gln Arg Leu Ser Ile Gln Pro Leu  
195 200 205

Thr Gln Glu Glu Phe Asp Phe Val Leu Ser Leu Glu Glu Lys Glu Pro  
210 215 220

Ser  
225

<210> 12  
<211> 328  
<212> PRT  
<213> Homo sapiens

<400> 12

Met Ser Met Leu Ala Glu Arg Arg Arg Lys Gln Lys Trp Ala Val Asp  
1 5 10 15

Pro Gln Asn Thr Ala Trp Ser Asn Asp Asp Ser Lys Phe Gly Gln Arg  
20 25 30

Met Leu Glu Lys Met Gly Trp Ser Lys Gly Lys Gly Leu Gly Ala Gln  
35 40 45

Glu Gln Gly Ala Thr Asp His Ile Lys Val Gln Val Lys Asn Asn His  
50 55 60

Leu Gly Leu Gly Ala Thr Ile Asn Asn Glu Asp Asn Trp Ile Ala His  
65 70 75 80

Gln Asp Asp Phe Asn Gln Leu Leu Ala Glu Leu Asn Thr Cys His Gly  
85 90 95

Gln Glu Thr Thr Asp Ser Ser Asp Lys Lys Glu Lys Lys Ser Phe Ser  
100 105 110

Leu Glu Glu Lys Ser Lys Ile Ser Lys Asn Arg Val His Tyr Met Lys  
115 120 125

Phe Thr Lys Gly Lys Asp Leu Ser Ser Arg Ser Lys Thr Asp Leu Asp  
130 135 140

Cys Ile Phe Gly Lys Arg Gln Ser Lys Lys Thr Pro Glu Gly Asp Ala  
145 150 155 160

Ser Pro Ser Thr Pro Glu Glu Asn Glu Thr Thr Thr Ser Ala Phe  
165 170 175

Thr Ile Gln Glu Tyr Phe Ala Lys Arg Met Ala Ala Leu Lys Asn Lys  
180 185 190

Pro Gln Val Pro Val Pro Gly Ser Asp Ile Ser Val Thr Gln Val Glu  
195 200 205

Arg Lys Arg Gly Lys Lys Arg Asn Lys Glu Ala Thr Gly Lys Asp Val  
210 215 220

Glu Ser Tyr Leu Gln Pro Lys Ala Lys Arg His Thr Glu Gly Lys Pro  
225 230 235 240

Glu Arg Ala Glu Ala Gln Glu Arg Val Ala Lys Lys Lys Ser Ala Pro  
245 250 255

Ala Glu Glu Gln Leu Arg Gly Pro Cys Trp Asp Gln Ser Ser Lys Ala  
260 265 270

Ser Ala Gln Asp Ala Gly Asp His Val Gln Pro Pro Glu Gly Arg Asp  
275 280 285

Phe Thr Leu Lys Pro Lys Lys Arg Arg Gly Lys Lys Lys Leu Gln Lys  
290 295 300

Pro Val Glu Ile Ala Glu Asp Ala Thr Leu Glu Glu Thr Leu Val Lys  
305 310 315 320

Lys Lys Lys Lys Lys Asp Ser Lys  
325

<210> 13  
<211> 1765  
<212> DNA  
<213> Homo sapiens

<400> 13  
gtcgaccac gcgtccgggc accaacagca gcgccgctgc caccgcccac cttctgccgc 60  
cgccaccaca gccaccttct cctcctccgc tgctctctcc gtctctgcct ctgtcgacta 120  
tcaggtgagc tttgaaccag gatggctgag ccccgccagg agttcgaagt gatggaagat 180  
cacgctggga cgtacgggtt gggggacagg aaagatcagg ggggctacac catgcaccaa 240  
gaccaagagg gtgacacgga cgctggcctg aaagaatctc ccctgcagac cccactgag 300  
gacggatctg aggaaccggg ctctgaaacc tctgatgcta agagcactcc aacagcggaa 360

gctgaagaag caggcattgg agacaccccc agcctggaag acgaagctgc tggtcacgtg	420
acccaagctc gcatgggtcag taaaagcaaa gacgggactg gaagcgaatga caaaaaagcc	480
aagacatcca cacgttcctc tgctaaaacc ttgaaaaata ggccttgcct tagccccaaa	540
caccccactc ctggtagctc agaccctctg atccaaccct ccagccctgc tgtgtgcccc	600
gagccacctt cctctcctaa atacgtctct tctgtcactc cccgaactgg cagttctgga	660
gcaaaggaga tgaaactcaa gggggctgat ggtaaaacga agatcgccac accgcgggga	720
gcagcccctc caggccagaa gggccaggcc aacgccacca ggattccagc aaaaacccca	780
cccgtctcaa agacaccacc cagctctggt gaacctccaa aatcagggga tcgcagcggc	840
tacagcagcc ccggctcccc aggcactccc ggcagccgct cccgcacccc gtcccttcca	900
acccaccca ccggggagcc caagaagggtg gcggtggtcc gtactccacc caagtcgccg	960
tcttccgcca agagccgcct gcagacagcc cccgtgcccc tgccagacct gaagaacgtc	1020
aagtccaaga tcggctccac tgagaacctg aagcaccagc cgggaggcgg gaagggtgcaa	1080
atagtctaca aaccagttga cctgagcaag gtgacctcca agtgtggctc attaggcaac	1140
atccatcata aaccaggagg tggccagggtg gaagtaaaat ctgagaagct tgacttcaag	1200
gacagagtcc agtcgaagat tgggtccctg gacaatatca cccacgtccc tggcggagga	1260
aataaaaaga ttgaaaccca caagctgacc ttccgcgaga acgccaagc caagacagac	1320
cacggggcgg agatcgtgta caagtcgcca gtggtgtctg gggacacgtc tccacggcat	1380
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<213> Homo sapiens

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